



TECHNICAL GUIDANCE

ADHESIVES
QUALITY CONTROL

ENSURING THAT CLIENTS OBTAIN
HIGH QUALITY POLYMER-BASED
SINGLE PLY ROOFING, THROUGH A
PARTNERSHIP OF QUALITY ASSURED
MANUFACTURERS AND CONTRACTORS

GUIDANCE DOCUMENT

QUALITY CONTROL AND USE OF ADHESIVES FOR THE ATTACHMENT OF AIR & VAPOUR CONTROL LAYERS, INSULATION AND SINGLE PLY MEMBRANE IN FLAT ROOFING

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1.0 INTRODUCTION

The popularity of modified bitumen, polyurethane and rubber-based cold applied adhesives for bonding insulation and polymeric single ply membranes has increased significantly in recent years. Cold applied adhesives allow for bonding to be carried out without the need for hot works. There is scope for improved productivity, and some products offer improved performance in conditions that are not totally dry.

It is an unfortunate feature of building construction that the performance advantages of new, more buildable technologies are often compromised by poor design and /or installation methods. This is also true for adhesives. The bonding of all layers is critical for a roof system's resistance to wind uplift and it is easy to forget that the bond strength between each layer of the roof build-up must be known if a robust construction is to be achieved. Those used to working with bitumen have traditionally used the blanket prescription detailed in BS8217 to achieve various bond strengths depending upon substrate and whether controlled partial bond or full bond. With proprietary adhesives, no such prescription exists.

2.0 SCOPE

This guide addresses the appropriate product performance, design, site work considerations and requirements with respect to adhesive bonding. This includes the adhesion of the air and vapour control layer (AVCL) to the roof decking, the insulation to the AVCL, the facings (if used) to the insulation board and the membrane to the

insulation. It is intended for use by designers, specifiers, project managers and roofing contractors. Advice as to the performance requirements, use and installation of the AVCL, insulation, single ply membrane and adhesives should be sought from each manufacturer.

3.0 SELECTION OF ROOF SYSTEM – GENERAL DESIGN CONSIDERATIONS

Any proposals for an adhered roof build up must be made in accordance with the technical requirements of the manufacturers of the membrane, insulation, AVCL and where appropriate, adhesives.

The maximum size of insulation board should be less than 2.88m². It should be noted that the insulation board facings (where applicable) should be suitable for an adhered installation and that the bond strength between the facing and insulation itself is adequate.

Adhesion of the insulation to the AVCL must be in accordance with the adhesive manufacturer's instructions for individual projects (see 4.3.3 & 4.4.3). Where the insulation adhesive is applied in beads, the wet applied width (diameter) and spacing of beads should be in accordance with the adhesive manufacturer's specification to meet the appropriate requirement for wind uplift resistance.

The application of the insulation adhesive in a wave pattern across the surface of the vapour control layer or (in its absence, the deck) is not advised since this technique does not allow for consistent adhesive coverage.

If a complete roofing system (i.e. AVCL, insulation, waterproofing membrane) is to be provided (supplier approach is to be adopted) then the individual adhesive bond (layer) strengths between layers may not need to be considered. However, the overall performance of the complete system will need to be (shall be have been) established by testing.

3.1 PROJECT TYPE

3.1.1 NEW BUILD

In the case of new build projects it is essential to ensure that the correct build up is selected to meet the clients, specifiers and others requirements. It is essential that the appropriate AVCL, adhesive, insulation and membrane manufacturer's recommendations are understood, agreed and followed. All parties should agree on the chosen combination of products. If substitution of components is proposed, there should be a thorough re-evaluation of the proposed construction combination and of any risk so created. The selection of components should follow the quality criteria defined in the SPRA Design Guide (1).

3.1.2 REFURBISHMENT

The condition, suitability, thermal performance and structural integrity of the existing and proposed roof build up should be assessed to ensure security against wind load and integrity over the roof's anticipated lifetime.

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It is important to establish that there has been no impairment of the roof structure or that its load bearing capacity has been compromised due to previous refurbishment operations. If it is apparent that the integrity of the existing roof structure is or may have been compromised then professional assistance should be sought (see 4.4.2).

Where bituminous roofs are installed on timber decks, it may be that the bond between the deck and first layer has failed and will therefore not be a suitable substrate for a simple adhered solution.

3.2 WIND LOADING

Prior to commencing the project, wind load calculations must be carried out by a competent person. Should an adhered solution be selected it must be demonstrated that the calculated wind load values fall within the accepted

maximum design resistance of the system proposed including the provision of a suitable factor of safety. In order to ensure compliance with the design requirements for wind uplift, appropriate test evidence should be available from the system provider in conjunction with the appropriate adhesive manufacturer. This should be based upon the test method outlined by MOAT 50:1992 'Technical guidelines for the assessment of thermal insulation systems intended for supporting waterproof coverings on flat and sloping roofs' (2). Submitted wind uplift calculations must denote the safety factor of resistance for normal materials (m) for the complete roof construction used.

If required, it is possible to undertake on-site measurement of the adhesive bond strength between the different layers say by using the US Single Ply Roofing Industry (SPRI) test method - (3), (4). It should be noted that 'static' adhesive bond strengths measured by the SPRI test method should only be used for on-site quality control and should not be used as a substitute for the 'dynamic' MOAT 50(2) system test.

SPRA has published guide S11a-16 'Wind load - a checklist of the parameters required for wind load calculation' (5) and S11b-18 'Wind load - a protocol for calculation' (6). The latter includes safety factors required for wind load design in adhered specifications.

3.3 INSTALLER TRAINING

Site operatives must be properly trained in the application of specific components that will constitute the build up of the roof under consideration. It is the responsibility of the specialist roofing contractor to ensure that the key personnel installing products are appropriately trained. Component manufacturers should be expected to provide training for their appropriate products. Competence with one particular manufacturer's products does not necessarily qualify an individual to install another's equivalent product.

4.0 CHECKLIST OF INFORMATION REQUIRED

4.1 GENERAL

Project name	
Project address	
Reference	
Postcode	
Roof reference	

4.2 ROOF SUMMARY

Height	
Dimensions (width, length)	
Parapets: height (min max)	
Areas involved	
Responsible party for the wind uplift calculation?	

4.3 NEW BUILD

4.3.1 DECK

Type	
Surface finish	
Acceptable condition?	

4.3.2 AIR AND VAPOUR CONTROL LAYER

Type	
Supplier	
Compatibility with materials to be adhered (adhesive supplier)	
Adhesive bond strength (design value). Supported by relevant test data (adhesive supplier)	
Advised coverage	

4.3.4 INSULATION

Insulation manufacturer	
Insulation type	
Facing (if any)	
Board size	
Compatibility with proposed adhesive	

4.3.5 WATERPROOFING MEMBRANE

Membrane manufacturer	
Membrane type	
Compatibility with materials to be adhered (membrane manufacturer)	
Adhesive bond strength (design value) Supported by relevant test data (membrane manufacturer)	
Adhesive type & coverage	

4.4 REFURBISHMENT

4.4.1 SURFACE ON WHICH ADHESIVE IS TO BE USED

Type	
Surface finish	
Suitability of existing roof finish to accept overlay	Y/N
Necessary preparatory work	
Method of attachment (backed up by on-site testing)	
Compatibility with adhesive proposed to secure insulation. (adhesive supplier)	
Compatibility with the insulation	

4.4.2 STRUCTURAL INTEGRITY / CONDITION OF ROOF DECK

Have previous refurbishment operations overloaded the roof construction?	
Has structure been weakened by water ingress? (Check by viewing deck from inside)	
Condition	
Establish cause and location of water penetration.	
Does deck consist of strawboard or chipboard?	
Are electrical services located within the roof deck construction? (Concrete decks)	

4.4.3 INSULATION ADHESIVE

Type	
Supplier	
Compatibility with materials to be adhered (adhesive supplier)	
Adhesive bond strength (design value) Supported by relevant test data (adhesive supplier)	
Advised coverage	

4.4.4 INSULATION

Insulation manufacturer	
Insulation type	
Facing (if any)	
Board size	
Compatibility with proposed adhesive	

4.4.5 WATERPROOFING MEMBRANE

Membrane manufacturer	
Membrane type	
Adhesive type	
Compatibility with materials to be adhered (membrane manufacturer)	
Adhesive bond strength (design value). Supported by relevant test data (membrane manufacturer)	
Adhesive type and coverage	

5.0 REFERENCES

- 1) SPRA Design Guide for Single Ply Roofing.
- 2) MOAT 50:1992 'Technical guidelines for the assessment of thermal insulation systems intended for supporting waterproof coverings on flat and sloping roofs'.
- 3) ANSI-SPRA IA-1:2005 Standard Field Test Procedure for Determining the Mechanical Uplift Resistance of Insulation Adhesives over Various Substrates.
- 4) Com-Ten Industries URF2424 pulling plate.
- 5) SPRA S11a-16: 'Wind load - a checklist of parameters required for calculation'.
- 6) SPRA 11b-18: 'Wind load - a protocol for calculation'.

6.0 ADHESIVE INSTALLATION CHECKLIST

Contract no.			
Project name			
Location			
Date of inspection			
Inspected by			
Adhesive application applicable. (Tick appropriate column)	AVCL	Insulation	Membrane
Check the following (Indicate Yes or No or Comment)			
Are weather conditions appropriate (temperature, humidity etc for the application of adhesive)?			
Have operatives received appropriate manufacturer's training?			
Are operatives aware of job specific installation requirements? (Bead size and spacing, required coverage rates etc).			
Is use and application technique as per adhesive manufacturer's recommendations / method?			
Have adhesive shelf life and storage instructions been checked?			
Is substrate in suitable condition to receive adhesive?			
If no state what corrective action is required?			
Is the AVCL / insulation / membrane type as specified?			
If no state what corrective action is required?			
Has installation been photographed and identified?			
Additional comments			
Signed:		Date:	



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